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DEDICATION OF THE STUDENTS' OBSERVATORY,
AT BERKELEY.

INTRODUCTORY REMARKS.

BY DIRECTOR W. W. CAMPBELL.

(Before the Society at the meeting in Berkeley, January 30, 1904.)

There is probably no situation in which men and their work are more accurately judged than in a great modern university. The real and the superficial are almost unerringly sorted out by the open-minded and quick-witted students, by colleagues on the faculties, and by the conscientious and responsible heads of the institutions. The departments which seem to prosper year after year are really prosperous and are deservedly so.

One of the conspicuous features of university governments is an application of a very old truth—to the department that hath shall be given.

The addition to the Students' Observatory which we have met to dedicate this evening is an illustration of this fact. It is not to be thought of as an addition to California's list of properties; it is not simply a building containing a collection of astronomical instruments,—that would be a museum. Friends have presented the instruments, and the University has accepted, mounted, and covered them, with the expectation, based upon the record of the Department, that they will be used. They are an opportunity, and at the same time a responsibility. It is intended, I think, that they shall be employed for two main purposes: for giving instruction in the fundamental principles of the science, and for making original investigations, principally by the officers of the Department.

The elements of astronomy are taught more or less efficiently in a great number of American schools and colleges. Some of the teaching is real astronomy, and other portions are called astronomy by courtesy. The varieties differ as widely as the work of a local business college differs from that of a great metropolitan banking institution. Our colleges and universities which are successfully teaching the theory and practice of astronomy can almost be counted upon the fingers

of the two hands. Nearly all of them make specialties of certain lines of astronomical work, depending upon the experience of the men in charge; and in these lines the instruction is of a very high grade. But there is, I think, no other American university in which real astronomy is taught so extensively as in the Berkeley Astronomical Department of the University of California. Taking into account also the astrophysical work and opportunities of the Department of Physics, and the encouragement and facilities extended, by fellowships and otherwise, to especially promising students at the Lick Observatory in all lines of research prosecuted there, the astronomical advantages of the University certainly seem to be unsurpassed. It is a pleasure to note that all the men who have taken advantage of them in the past few years have secured appointments to positions which afford them at least the opportunity to make suitable returns.

There is a strong and increasing demand for well-trained men and women to fill university and observatory positions, and I trust that the Berkeley Astronomical Department will have continually growing success in starting promising students on their careers in this pure science.

It is not desirable that these new instruments should cause individual students to spend more time on their undergraduate astronomy; but, rather, that they should spend the same amount of time more efficiently, and that a greater number of students should be attracted to the study of astronomy and have their requirements suitably met. If these instruments should entice the future astronomer away from simultaneous studies in the English language and literature, in history, in economics, and in other studies which broaden and balance him, then they would in fact be a detriment. Any undergraduate training in our science secured at the sacrifice of a liberal and broad education is a failure. No matter how excellent his special training, the young astronomer starts upon his profession badly handicapped if he is not proficient in speaking and writing his own language, and if he does not possess reasonable knowledge of many subjects apparently unrelated to his science.

In these days of great things one frequently hears the opinion expressed that for useful investigational work in astron-

omy powerful telescopes are demanded. It is true that recent advances in our science have been due in large part to the possession of powerful and expensive equipment. But the directors of observatories possessing such equipment are wisely restricting their programmes of work to those problems which cannot be solved equally well with small instruments; and it would be a grievous mistake to assume that the small telescope in suitable hands is not able to render good account of itself. Reference to the work of a few small telescopes makes interesting reading:—

The observations for ARGELANDER'S *Durchmusterung*, the work consulted more frequently than any other by astronomers, were made with a 3-inch refractor;

The Cordoba *Durchmusterung*, continuing the above work to the South Pole, is based upon observations made with a 5-inch telescope;

Nearly all unexpected comets are discovered with instruments not more than six inches in diameter, and great numbers of accurate determinations of their positions are made with the same telescopes;

Remarkable contributions to our knowledge of the forms and development of comets have been made in the past twelve years almost wholly with photographic telescopes from four to six inches in diameter;

Our comprehension of the elements which contribute to success in the difficult work of measuring the motions of the stars in the line of sight has increased until to-day we should be able to prove with a 6-inch telescope and a suitable spectrograph that *Capella* is a spectroscopic binary star whose two components, of nearly equal size, revolve around their common center of mass in 104 days;

The work of Dr. ROBERTS in the past ten years, in South Africa, on the photometry of variable stars, has been remarkable for its accuracy, quantity, and systematic nature; yet it has all been done with telescopes varying in size from one to three inches;

KEELER'S spectrographic observations of the velocities in the ring system of *Saturn*, in my opinion, constitute the most beautiful individual observation made in recent times; yet his telescope, located in a region notorious for its poor atmos-

pheric conditions for such work, was only thirteen inches in diameter.

In closing this informal address, I beg to relate an incident which bears upon the question of the success of the excellent and beautifully finished new instruments which we are invited to inspect at the close of this meeting: In the year 1893, a prominent citizen of California, connected at the time with the educational system of the State, visited the Lick Observatory and inspected its instruments. I well recall his expression of disapproval when he saw that the brass tube of the Crocker telescope, with which Professor BARNARD was securing his famous photographs of the Milky Way and comets, looked worn, and did not carry the polish which one sees on the companion-rail of a steamship. And later in the day, when the star spectroscope, which Professor KEELER had used so successfully in measuring the motions of the planetary nebulae, and in investigations on objects of special interest, was seen to be worn and scratched from five years' continual use, it was remarked, quite forcibly, that we did not seem to be taking very good care of our instruments.

The most comprehensive good wish that I can make for the Berkeley Astronomical Department, in whose success we all rejoice, is, that when the Astronomical Society of the Pacific is again invited to hold a meeting in the Students' Observatory we shall find the varnish worn away from many parts of these new instruments.

HISTORY AND AIMS OF THE STUDENTS' OBSERVATORY.*

BY A. O. LEUSCHNER.

The buildings and equipment which we dedicate to-night bring us considerably nearer to the realization of the hope of having at the University of California a well-equipped Students' Observatory. Our hearts are full of gratitude to those who have helped us meet our most pressing needs.

* Address delivered before the Astronomical Society of the Pacific, January 30, 1904, at the dedication of the new observatory buildings of the University of California. Rewritten for the *Publications* of the Astronomical Society of the Pacific.



THE STUDENTS' OBSERVATORY, AT BERKELEY, CALIFORNIA.